

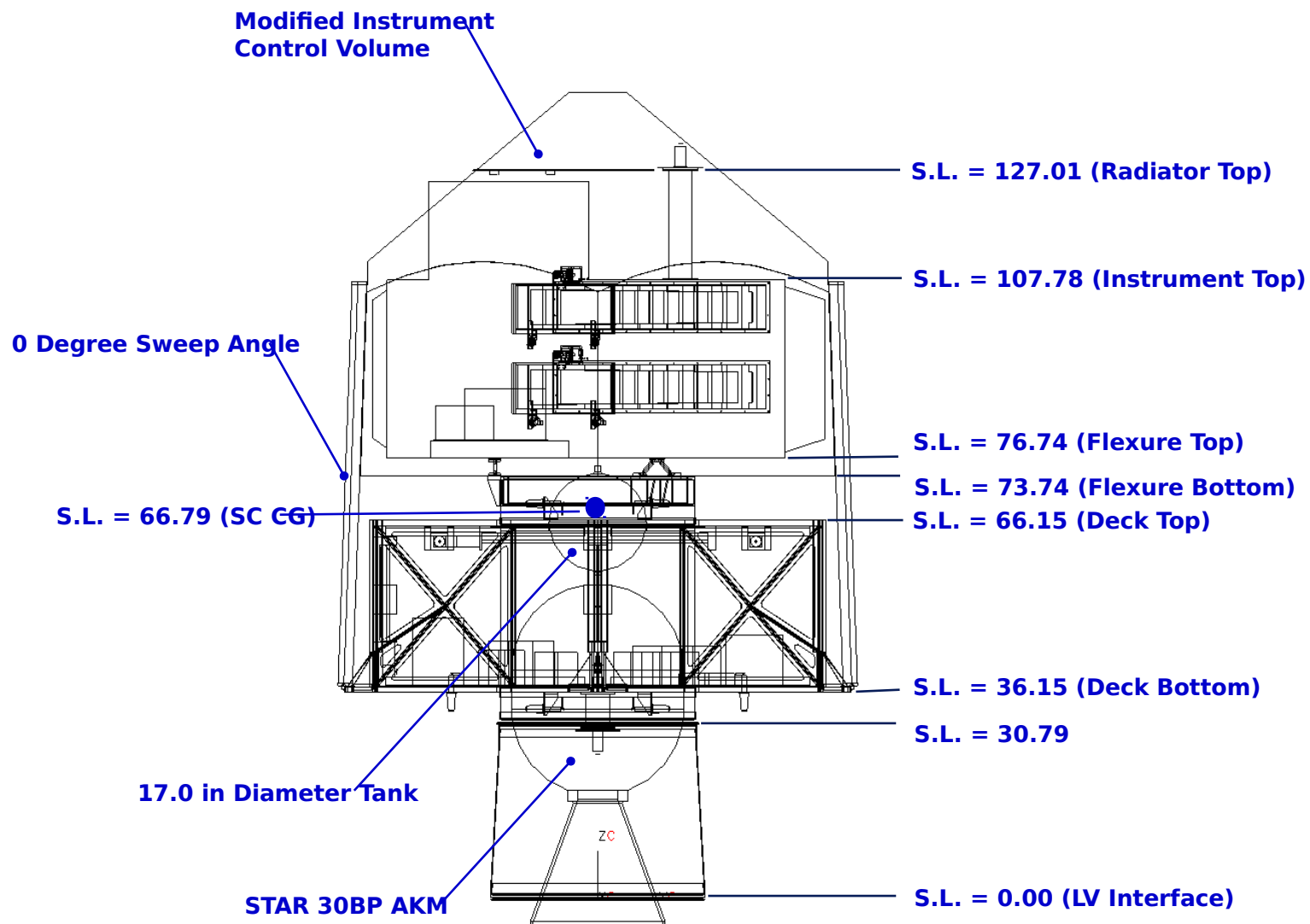


# Technical Interchange Meeting

**Ron Mader**  
**Mechanical Manager**  
**NRL**  
**202-404-3470**  
**[rmader@space.nrl.navy.mil](mailto:rmader@space.nrl.navy.mil)**  
**February 6<sup>th</sup> and 7<sup>th</sup>**



# 1<sup>st</sup> Design Iteration (1 of 2)





# 1<sup>st</sup> Design Iteration (2 of 2)



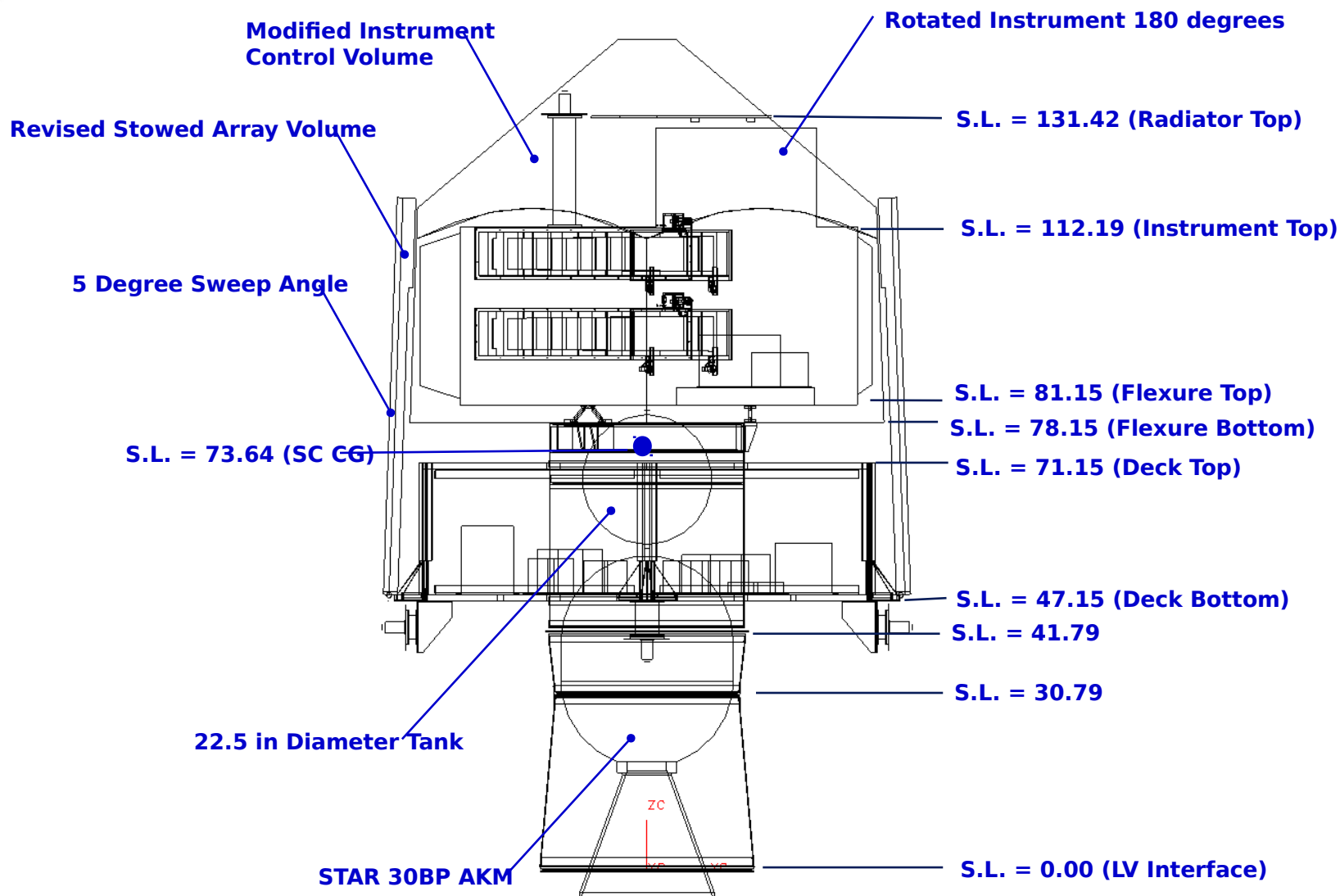
- **Mass Properties Comparison to CSR**

ITEMS	CSR (lbm)	1st Design Iteration (lbm)
Electronics Deck	13.75	39.33
Solar Array Panels	56.10	125.52
Solar Array Webs	-	47.43
Ballast Mass	-	94.38
Balance Mass	30.00	151.81
Trim Mass Assy, CG Control	33.00	149.71
Thermal Blankets, Total	14.40	81.87
Hyrazine Propellant	110.00	145.48
Instrument Assy	505.30	589.25
Total SC	1238.25	2044.31

- **Reduce Flight Vehicle Dry Mass by 500 lbm to Utilize the 9 Strap on Delta II With STAR 30BP AKM or 200 lbm to Utilize the 9 Strap on Delta II With STAR 37XFP AKM**
- **2<sup>nd</sup> Design Iteration Approach**
  - **Reduce Bus Height to Reduce Overall Mass and Provide a Better Inertia Ratio**
  - **Rotate Instrument Assy to Reduce Balance Mass**
  - **Move Instrument Axially to Provide More Room for Larger Hydrazine Tank**
  - **Redesign Arrays for 5 degree Sweep Angle**
  - **Optimize Ballast Masses and Locations to Obtain Appropriate Inertia Ratio**



# 2<sup>nd</sup> Design Iteration (1 of 2)





## 2<sup>nd</sup> Design Iteration (2 of 2)



- **Mass Properties Comparison to 1<sup>st</sup> Design Iteration**

ITEMS	1st Design Iteration (lbm)	2nd Design Iteration (lbm)
Electronics Deck	39.33	31.70
Solar Array Panels	125.52	123.75
Solar Array Webs	47.43	34.96
Ballast Mass	94.38	15.07
Balance Mass	151.81	95.68
Trim Mass Assy, Total	149.71	149.71
Thermal Blankets, Total	81.87	81.87
Hydrazine Propellant	145.48	145.48
Instrument Assy	589.25	589.25
Total SC	2044.31	1853.05

- **3<sup>rd</sup> Design Iteration Approach**
  - Increase Plane Separation for Spin Balance to Reduce Balance Masses
  - Move Instrument Laterally to Reduce Balance Masses
  - Work to Remove Trim Masses for C.G. Control
  - Reduce SC Height Again to Reduce Ballast Masses
  - Optimize Electronics Deck Layout
  - Add Holes to Solar Array Panels, Webs, and Trim Tabs to Reduce Overall Mass
  - Implement STAR 37 XFP AKM in the Overall Design
  - If Possible, Eliminate Solar Array Panel and Web Thermal Blankets
- **Need to Redesign the System, Instrument and Bus, if the 3<sup>rd</sup> Design Iteration Still is Too Heavy for The 9 Strap on Delta II With STAR 37 XFP AKM Configuration**